

structure (see, for example, composite 37 in Figs. 6 and 7) comprising a first refractory metal silicide, a second refractory metal silicide, and an intermetallic compound of the two refractory metals from the refractory metal silicides. In a preferred embodiment of the invention, the refractory metals are titanium and tungsten.

In the Office Action, the Examiner rejected claims 31-37 under 35 USC §103 as unpatentable over Chung. Chung was asserted to teach a method for forming a local interconnect structure for a field effect transistor which included a first refractory metal silicide 32 and a second refractory metal silicide 40. The first refractory metal silicide was said to be titanium silicide, while the second refractory metal silicide was said to be tungsten silicide. Chung was further alleged to teach that "at temperatures above 900°C an intermetallic compound comprising tungsten and titanium is formed between the first and second silicide layers." The Examiner concluded that it would have been obvious to one skilled in the art to form a "composite structure such as the one taught by Chung" and "to include the intermetallic compound to promote better adhesion between the silicide layers that the composite structure comprises."

Applicant does not agree that the Examiner has accurately characterized the teachings of Chung. What Chung shows in Fig. 5 is a layer of titanium silicide 32 atop a layer of polysilicon 22, and a layer of tungsten silicide 40 atop layer 32. The layers are shown as separate layers, and no composite structure is shown. Further, these layers are taught by Chung to form contacts. The interconnects of Chung are layers 48, 50, and 52 (see, col. 5, line 56).

What Chung actually states is that:

The temperature at which tungsten silicide forms during annealing should lie approximately between 600°C and 900°C. At a temperature substantially lower than 600°C, no tungsten silicide formation occurs, whereas at a temperature higher than 900°C, intermixing of silicon, titanium, and tungsten, and intermixing of tungsten and oxide develops. The tungsten that overlays oxide layer 34 is selectively removed, for instance, by means of a selective etching solution. The result is shown in FIG. 4, wherein tungsten silicide layers 37, 38 and 40 respectively cover titanium silicide layers 28, 30 and 32.

Chung teaches away from the formation of a composite structure as claimed by applicant. Chung states that any intermixing of the two silicide layers is undesirable. See, for example, col. 6, line 17 and again at lines 49-54. Thus: (1) Chung does not teach or suggest the formation of a composite structure; (2) Chung teaches away from processing conditions which would cause "undesirable" intermixing of the layers; (3) Chung never mentions the formation of any intermetallic compound, simply the possibility of "intermixing" of different elements and oxides; and (4) Chung's interconnects are formed of aluminum or other metal/alloy (col. 5, lines 55-58, and claim 13), not the metal silicide layers. Applicant submits that upon closer review of Chung, Chung fails to teach or suggest the subject matter of the claimed invention. The rejection is not well taken and should be withdrawn.

Also in the Office Action, the Examiner rejected claims 38-40 under 35 USC §103 as unpatentable over Dao et al in view of Chung. Dao et al was asserted to teach a memory array architecture which includes titanium silicide interconnects. The Examiner concluded that it would have been obvious to one skilled in the art to form a local interconnect "as taught by Chung" in the memory array of Dao et al.

However, this rejection also relies upon the same incorrect reading of Chung as discussed in detail above. Chung does not teach a composite structure, does not teach the formation of an intermetallic compound (and in fact teaches away), and does not use the two silicide layers as a local interconnect. This rejection fails for the same reasons that the rejection of claims 31-37 fails. The rejection is not well taken and should be withdrawn.

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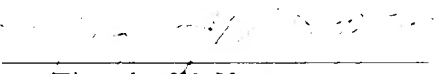
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For all of the above reasons, applicant submits that claims 31-40 are patentable over the cited and applied art. Early notification of allowable subject matter is respectfully solicited.

Respectfully submitted,
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